

Claims

1. Apparatus for forming a row of sliced product having a maximum lateral dimension (as hereinbefore defined) when aligned in a row including a reservoir for the product, an inclined slatted conveyor extending through the reservoir to elevate the product on to a receiving surface characterised in that the slats are spaced by a distance which is 95%-105% of the maximum lateral dimension and in that the height of the slats is approximately equal to the thickness of the slices and in that there is a plurality of wiping means or wipers spaced along the conveyor for displacing slices, which do not lie between the slats.
2. Apparatus as claimed in claim 1 wherein there are between two and five wiping means or wipers.
3. Apparatus as claimed in claims 1 or 2 wherein there are five wiping means or wipers.
4. Apparatus as claimed in any one of claims 1 to 3 wherein the wiping means or wipers are in the form of flexible blades extending laterally across the conveyor.
5. Apparatus as claimed in any one of claims 1 to 3 wherein the wiping means or wipers include at least one rigid pin.
6. Apparatus as claimed in claim 5 including the wiping means or wipers including a transport for sweeping the pin across the conveyor.
7. Apparatus as claimed in any one of the preceding claims wherein the conveyor is inclined at an angle in the range 45° - 60°.
8. Apparatus as claimed in claim 7 wherein the angle of inclination is determined by the product such that for:
 - (a) sliced tomatoes the angle of inclination is in the range 45° - 55°.
 - (b) sliced cucumber the angle of inclination is in the range 50° - 60°.

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(c) sliced sausages the angle of inclination is between 45° - 55°.

9. Apparatus as claimed in claim 7 wherein the angle of inclination is 52.5°.

10. Apparatus as claimed in any one of the preceding claims wherein at least some of the surfaces of the reservoir are roughened or locally raised to reduce surface tension.

5 11. Apparatus as claimed in any one of the preceding claims wherein the conveyor includes a belt for bearing the product and has a low coefficient of friction.

12. Apparatus as claimed in any one of the preceding claims wherein the conveyor is driven discontinuously or jerkily.

10 13. Apparatus as claimed in claim 12 wherein the conveyor is driven in steps approximately equal to the separation of the slats.

14. Apparatus as claimed in claim 12 wherein the conveyor is driven jerkily.

15 15. Apparatus as claimed in claim 4 wherein the first wiper blade in the direction of motion of the conveyor is further away from the conveyor than is the last wiper blade.

16. Apparatus as claimed in claim 15 wherein the blades intermediate the first and the last are successively in the direction of motion of the conveyor, closer to the conveyor.

20 17. Apparatus as claimed in any one of the preceding claims further including the receiving surface and an abutment overlying the receiving surface and facing the downstream end of the conveyor for correcting any misalignment in the row.

18. Apparatus as claimed in claim 17 wherein the abutment is moveable towards or away from the conveyor to push the slices into alignment.

25 19. Apparatus as claimed in claim 17 or 18 wherein the receiving surface is a further conveyor.

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20. Apparatus as claimed in any one of claims 17 to 19 wherein in the abutment extends at an angle to the direction of travel of the receiving surface.
21. Apparatus for forming patterns of sliced product from a row thereof including a first conveyor for delivery a row of sliced product to a first transfer point; a second conveyor for receiving slices at the first transfer point and conveying the slices generally in the same direction as the first conveyor to a second transfer point characterised in that the second conveyor is intermittently driveable and laterally displaceable relative to the first conveyor to allow slices to be located thereon at predetermined laterally and longitudinally displaced positions.
- 10 22. Apparatus as claimed in claim 21 wherein the second conveyor is itself formed from a plurality of parallel adjacent conveyors, each separately controllable.
- 15 23. Apparatus as claimed in Claim 22 wherein the adjacent conveyors are mounted on a plurality parallel, independently drivable spline drives for 'lateral' movement along the drives, there being one drive for each conveyor and each conveyor only being drivingly engaged to its respective drive.
- 20 24. Apparatus as claimed in any one of Claims 21 to 33 wherein the first or second conveyor has a lateral position in which a slice delivered to the transfer point will fall past that conveyor to be rejected.
- 25 25. Apparatus as claimed in any one of claims 21 to 24 further including a detector for detecting the location of a product in the row and a controller for controlling the operation of the first and second conveyors in accordance with the detected position or the detected absence of product from a row location.
- 25 26. Apparatus as claimed in claim 25 further including a visual recognition device for assessing whether or not a product should be rejected and wherein

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the controller controls operation of the first or second conveyor in response to the visual recognition device.

27. Apparatus as claimed in claim 26 wherein the visual recognition device constitutes the detector.

5 28. Apparatus as claimed in any one of claims 21 to 27 further including a third conveyor for receiving patterned product at the second transfer point and for delivering the pattern to a substrate location.

29. Apparatus as claimed in claim 28 wherein the third conveyor is downwardly inclined with respect to the second conveyor.

10 30. Apparatus as claimed in claims 28 or 29 wherein the third conveyor initially accelerates each pattern away from the second transfer point.

31. Apparatus as claimed in any one of the claims 28 to 30 the first, second and third conveyors are disposable above a substrate conveyor for delivering substrates to the substrate location.

15 32. Apparatus as claimed in any one of claims 28 to 31 further including a further detector for detecting the approach of a substrate to the substrate location and wherein the controller operates the apparatus in response to that detection step.

20 33. Apparatus for delivering a pattern of product to a substrate including apparatus for forming a row as claimed in any one of claims 1 to 20 and apparatus for forming a pattern as claimed in any one of claims 21 to 32.

34. Apparatus as claimed in claim 33 wherein the apparatus is free standing.

25 35. Apparatus for delivering a pattern of product to a substrate, travelling on a substrate conveyor, at a substrate location including a detector for detecting the approach of a substrate to the substrate location and a controller for controlling the operation of the apparatus in dependence on the substrate detection.

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36. Apparatus as claimed in any one of claims 33 to 35 wherein the substrate is a bread slice or a pizza base.

37. Apparatus as claimed in any one of the preceding claims other than claims 5 or 6 or claims dependent thereon wherein the product is cucumber or tomato.

38. Apparatus as claimed in claim 5 or claim 6 or claims dependent thereon wherein the product is sausage.

39. An assembly of independently drivable laterally movable adjacent conveyors, wherein the conveyors are mounted on a plurality of parallel, independently drivable spline drives for 'lateral' movement along the drives, there being one drive for each conveyor and each conveyor only being drivingly engaged to its respective drive.

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